**How to apply the NComputing Scaling Guide to my Environment**

At NComputing, our QA lab ran several use cases to determine how many NComputing clients could connect to any given host under certain workload scenarios. To better understand how our solution will perform in your environment it is critical you read our Knowledge Base (KB) article titled [Guidelines for M-Series and L-Series Host Scaling](http://www.ncomputing.com/kb/vSpace-Guidelines-for-Scaling-Deployments_310.html). Near the bottom of that document you will see a matrix of test results for several different processors under several different use cases.

Like engines, machines and other equipment, processors can be objectively benchmarked to correlate their performance to specific cases and to compare against other processors on the market. To do that you need to use a tool designed to measure activity under certain circumstances. The benchmark tool that I use regularly is called [PC Performance Test](http://www.passmark.com/download/pt_download.htm) by [Passmark](http://www.passmark.com/index.html). The utility is very inexpensive at $26 but also allows you to use it free for 30 days. Passmark anonymously collects data submitted by customers all over the world to aggregate and then publish the results on their website. As of this writing they had published performance data for over 1,200 processors collected from over 600,000 systems.

In the scaling guideline I referenced above, NComputing documented the results of 5 different processors under four different workload scenarios. I have placed a copy of the matrix results below in Figure 1.

While the chart in Figure 1 is great information the next question most customers ask next is how does that apply to my server that I have already purchased? Or another question often asked is, what kind of server should I purchase? If I implement a Hyper Visor, how many devices will I be able to put on the physical host, how many will I be able to put on each VM? These are all very good questions and can be challenging to answer. In the following text I will show you how to answer those questions and it’s a lot simpler than you think because NComputing’s QA department has already given us a pretty good baseline to extrapolate our answers.

The first thing we need to do is to come up with an average ratio that will allow us to take a processors benchmark number and divide it by the ratio giving us a number of NComputing seats that can be supported by the target processor. Another outcome the ratio provides for us is the ability to figure out what performance we need from a processor to support a specific number of hosts.

Example A - Let’s assume we have a certain model processor called XYX and its Passmark benchmark is 16,000. Let’s also assume that NComputing’s QA lab was able to get 100 L300 devices operating with a light workload scenario as defined in the [Scaling Guideline](http://www.ncomputing.com/kb/vSpace-Guidelines-for-Scaling-Deployments_310.html) referenced above. Given this example our ratio is 160 and would be calculated as follows:

Passmark Benchmark Data / Number of Devices = Ratio

16,000 / 100 = 160

To answer a similar question with the same formula, what if the environment needed to support a 30 seat lab with the same use case as defined above. Because we already figured out the ratio you could look to purchase a processor that had a Passmark Benchmark of 4,800. This would be calculated as follows:

Number of Devices \* Ratio = Passmark Benchmark Data

30 \* 160 = 4,800

**Typical Maximum Number of  Users by Workload/Host Configuration**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Max. Number of Users** | | |
|  | **Entry-Level Host** | **Mid-Range Host** | **High-End Host** |
|  | **Intel™ Core2 Quad Q8300** -or- **Intel Xeon E5507  8 GB RAM DDR2/DDR3 Standard SATA or SSD Drive Server 2008 R2 SP1 (64-bit)** | **Intel Core™ i7 2600 Quad-Core** -or- **Intel Xeon X5670**  **16 GB RAM DDR3** **10K RPM SATA or SSD Drive Server 2008 R2 SP1 (64-bit)** | **Dual Xeon™ X5660, 6 Cores**    **24 GB RAM DDR3** **4x 15,000 RPM SAS drives (RAID 10) Server 2008 R2 SP1 (64-bit)** |
| **Low Workload** | **20** | **60** | **100** |
| **Medium Workload** | **15** | **45** | **80** |
| **High Workload** | **12** | **35** | **60** |
| **480p Video** | **11** | **20** | **60** |
| **720p Video** | **9** | **16** | **35** |

Fig 1.

Now let’s fill in the matrix results a little differently from Figure 1 by placing the CPU Benchmark Mark in the respective columns and divide them by the number of devices connected for each of the use cases. This will allow us to calculate a ratio for each of the processors tested under each use case. For simplicity I have removed the RAM and Hard Drive specs from the chart. I have also hyperlinked each processor to Passmark’s data for ease of reference. The ratio is then calculated for each use case in each processor model range by dividing the number of devices into the respective Passmark Mark.

**Typical Maximum Number of  Users by Workload/Host Configuration**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Max. Number of Users** | | |
|  | **Entry-Level Host** | **Mid-Range Host** | **High-End Host** |
|  | [**Intel™ Core2 Quad Q8300**](http://www.cpubenchmark.net/cpu.php?cpu=Intel+Core2+Quad+Q8300+%40+2.50GHz&id=9)-or-[**Intel Xeon E5507**](http://www.cpubenchmark.net/cpu.php?cpu=Intel+Xeon+E5507+%40+2.27GHz&id=1242) **Passmark Mark is 3096 and 3469 respectively**  **Let’s use an average of (3096 + 3469)/2 = 3279** | [**Intel Core™ i7 2600 Quad-Core**](http://www.cpubenchmark.net/cpu.php?cpu=Intel+Xeon+E5507+%40+2.27GHz&id=1242)-or- [**Intel Xeon X5670**](http://www.cpubenchmark.net/cpu.php?cpu=Intel+Xeon+X5670+%40+2.93GHz&id=1307) Passmark Mark is 8417 and 8801 respectively  **Let’s use an average of (8417 + 8801)/2 =**  **8,609** | [**Dual Xeon™ X5660, 6 Cores**](http://www.cpubenchmark.net/cpu.php?cpu=Intel+Xeon+X5660+%40+2.80GHz&id=1305) Passmark Mark for one is 8532 but since it’s a dual processor = 8532 \*2 = 16,652 |
| **Low Workload** | **3,279/20 =**  **163** | **8,609/60 =**  **143** | **16,652/100 =**  **166** |
| **Medium Workload** | **3,279/15 = 218** | **8,609/45 = 191** | **16,652/80 = 208** |
| **High Workload** | **3,279/12 = 273** | **8,609/35 = 245** | **16,652/60 = 277** |
| **480p Video** | **3,279/11 = 298** | **8,609/20 = 430** | **16,652/60 = 277** |
| **720p Video** | **3,279/9 = 364** | **8,609/16 = 538** | **16,652/35 = 475** |

Fig 2

Taking the chart in Figure 2 and creating some averages allows us to use some general numbers as guidelines for discussion and simplicity. Thus, the following statement can be made. For the following workload scenarios, use the respective ratios as defined below:

Low Workload Scenario – Ratio of 150

Medium Workload Scenario – Ratio of 200

High Workload Scenario – Ratio of 250

Video with 720p (which I would equate to sites with heavy Flash usage) – Ratio of 500

With this information we can now look at another processor that has not been tested by the NComputing QA team. For my example I’ve chosen one of the new Intel E5 processors, the E5-1660 @ 3.30 GHz. According to Passmark, that processor benchmarks at 13,093. Thus if we apply our ratios above we can get a pretty good ballpark of how many NComputing clients this processor will support.

Low Workload Scenario = 13,093/150 = 87

Medium Workload Scenario = 13,093/200 = 65

High Workload Scenario = 13,093/250 = 52

Video with 720p (which I would equate to sites with heavy Flash usage) = 13,093/500 = 26

Lastly, this same methodology can be applied to Virtual Machines simply by running the Passmark Benchmark on any given VM, taking the CPU Mark and applying the appropriate ratio to the result to calculate how many NComputing seats can be supported on the specific VM.